

CLAIMS

1. A method of generating a stress pulse in a tool by means of a pressure fluid operated impact device, a rock drill or a braker in particular, in which method the tool is arranged to be in contact with the material to be struck in order to produce an impact in the material to be processed, and pressure fluid is fed to the impact device and discharged therefrom in order to use the impact device, **characterized** in that in the impact device, pressure fluid is fed as pressure pulses to a working chamber residing in the impact device between a frame of the impact device and the tool such that the pressure of the pressure fluid produces a force between the frame of the impact device and the tool, the force pressing the tool towards the material to be processed such that due to the influence of the force, a stress pulse is generated in the tool in its longitudinal direction such that the stress pulse propagates through the tool to the material to be processed, the generation of the stress pulse ending substantially at the same time as the influence of the force on the tool ends.

2. A method as claimed in claim 1, **characterized** in that the stress pulse is substantially simultaneous with and similar in length to the influence of the force on the tool.

3. A method as claimed in claim 1 or 2, **characterized** in that the force produced by the pressure pulses is transmitted to the tool by means of a separate transmission piston residing between the working chamber and the tool.

4. A method as claimed in any one of claims 1 to 3, **characterized** in that the length of the stress pulse is adjusted by adjusting the length of the pressure pulse.

5. A method as claimed in any one of the preceding claims, **characterized** in that the amplitude of the stress pulse is adjusted by adjusting the amplitude of the pressure pulse.

6. A method as claimed in any one of the preceding claims, **characterized** in that the frequency of the stress pulses is adjusted by adjusting the feed frequency of the pressure pulses.

7. A method as claimed in any one of the preceding claims, **characterized** in that after an impact, the tool is returned to its pre-

impact position with respect to the impact device by pushing the impact device towards the tool.

8. A method as claimed in any one of the preceding claims, **characterized** in that after an impact, the tool is returned to its pre-impact position with respect to the impact device by bringing a separate force acting between the impact device and the tool to influence the tool, the force pushing the tool towards the impact device.

9. A method as claimed in claim 8, **characterized** in that the separate force acting between the impact device and the tool is produced by means of a pressure medium acting in a chamber residing between the frame of the impact device and the tool.

10. A method as claimed in any one of the preceding claims, **characterized** in that in order to produce a pressure pulse, energy is charged in an energy charging space provided in the impact device and operating as an energy charging means and filled entirely with pressurized pressure fluid, the volume of the energy charging space being substantially large as compared with the volume of a pressure fluid amount to be fed in one go to the working chamber during one pressure pulse.

11. A method as claimed in claim 10, **characterized** in that when the impact device is in operation, pressure fluid is fed to the energy charging space continuously, and that pressure fluid is discharged from the energy charging space periodically alternately to the working chamber and, correspondingly, the connection from the energy charging space to the working chamber is closed and the connection from the working chamber to a pressure fluid discharge channel is opened.

12. A method as claimed in any one of the preceding claims, **characterized** in that the pressure fluid feed is controlled by a control valve.

13. A method as claimed in claim 12, **characterized** in that the control valve (8) is a rotating valve provided with a plurality of successive openings in its direction of rotation to feed pressure fluid via a plurality of feed channels (6a) to the working chamber (7) simultaneously.

14. A method as claimed in claim 12, **characterized** in that the control valve (8) is a rotating valve provided with a plurality of successive openings in its direction of rotation to feed pressure fluid via a plurality of feed

channels (6a) to the working chamber (7) simultaneously, and to discharge pressure fluid from the working chamber (7).

15. A method as claimed in claim 12, **characterized** in that the control valve (8) is a rotating valve provided with a plurality of successive openings in its direction of rotation to feed pressure fluid via a plurality of feed channels (6a) to the working chamber (7) simultaneously and, correspondingly, a plurality of successive openings in its direction of rotation to discharge pressure fluid from the working chamber (7).

16. A pressure fluid operated impact device, a rock drill or a braker in particular, comprising a frame whereto a tool is mountable movably in its longitudinal direction, the tool, during an impact, being arranged to be in contact with the material to be struck, and means for feeding pressure fluid to the impact device and discharging pressure fluid therefrom in order to use the impact device, **characterized** in that the impact device comprises a working chamber and means for conveying pressure fluid as pressure pulses to the working chamber such that the pressure of the pressure fluid produces a force between the frame of the impact device and the tool, the force pressing the tool towards the material to be processed such that due to the influence of the force, a stress pulse is generated in the tool in its longitudinal direction such that the stress pulse propagates through the tool to the material to be processed, the generation of the stress pulse ending substantially at the same time as the influence of the force on the tool ends.

17. An impact device as claimed in claim 16, **characterized** in that the stress pulse in the tool is substantially simultaneous with and similar in length to the influence of the force on the tool.

18. An impact device as claimed in claim 16 or 17, **characterized** in that the working chamber resides between the frame of the impact device and the tool.

19. An impact device as claimed in any one of claims 16 to 18, **characterized** in that it comprises a transmission piston which moves in the working chamber, the transmission piston being provided with a pressure surface which resides towards the working chamber and which the pressure of the pressure fluid influences, and that the transmission piston is directly or indirectly in contact with the tool such that when the transmission piston moves, it produces a force acting between the frame of the impact device and the tool.

20. An impact device as claimed in claim 19, **characterized** in that the transmission piston moves in the axial direction of the tool.

21. An impact device as claimed in any one of claims 16 to 20, **characterized** in that the means for feeding and discharging pressure fluid comprise an energy charging space which contains pressurized pressure fluid and whose volume is substantially large as compared with the volume of the working chamber.

22. An impact device as claimed in claim 21, **characterized** in that when the impact device is in operation, the means for feeding pressure fluid to the impact device and for discharging pressure fluid therefrom allow pressure fluid to flow to the energy charging space continuously, and periodically alternately open the connection from the energy charging space to the working chamber and, correspondingly, close the connection from the energy charging space to the working chamber and open the connection from the working chamber to a pressure fluid discharge channel.

23. An impact device as claimed in any one of claims 16 to 22, **characterized** in that the means for feeding and discharging pressure fluid comprise a control valve.

24. An impact device as claimed in claim 23, **characterized** in that the control valve is arranged to control pressure fluid feed to the working chamber periodically.

25. An impact device as claimed in claim 23 or 24, **characterized** in that the control valve is arranged to control pressure fluid discharge from the working chamber periodically.

26. An impact device as claimed in any one of claims 23 to 25, **characterized** in that the control valve (8) is a rotating valve.

27. An impact device as claimed in claim 24, **characterized** in that the control valve (8) is a rotating valve provided with a plurality of successive openings in its direction of rotation to feed pressure fluid therethrough to the working chamber (7) simultaneously.

28. An impact device as claimed in claim 24 and 25, **characterized** in that the control valve (8) is a rotating valve provided with a plurality of successive openings in its direction of rotation to feed pressure fluid therethrough to the working chamber (7) simultaneously and, correspondingly, to discharge pressure fluid from the working chamber (7).

29. An impact device as claimed in claim 24 and 25, **characterized** in that the control valve (8) is a rotating valve provided with a plurality of successive openings in its direction of rotation to feed pressure fluid therethrough to the working chamber (7) simultaneously and, correspondingly, a plurality of successive openings in its direction of rotation to discharge pressure fluid therethrough from the working chamber (7) simultaneously.

30. An impact device as claimed in any one of claims 16 to 29, **characterized** in that it comprises means for returning a transmission piston and/or a tool after an impact to its substantially pre-impact position with respect to the impact device by pushing the impact device towards the tool.

31. An impact device as claimed in any one of claims 16 to 30, **characterized** in that it comprises means for returning a transmission piston and/or a tool after an impact to its substantially pre-impact position with respect to the impact device by bringing a separate force acting between the impact device and the tool to influence the tool, the force pushing the tool towards the impact device.

32. An impact device as claimed in any one of claims 16 to 31, **characterized** in that the means for producing the force acting between the separate impact device and the tool comprise a chamber residing between the impact device and the tool, wherein the force is produced by means of a pressure medium therein or to be fed thereto.